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Cyndie Eby
Executive Director-
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U S WEST

EX PARTE

April 1, 1996

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW, Room 222
Washington, DC 20554

RE: CC Docket 95-185

Dear Mr. Caton:

Attached is a copy of a letter delivered today to Mr. James Coltharp, Wireless Telecommunications Bureau, concerning the above-referenced proceeding.

In accordance with Section 1.1206(a)(1) of the Commission's rules, a copy of the letter is being served upon you for inclusion in the public record.

Acknowledgment and date of receipt of this submission are requested. A duplicate letter is attached for this purpose.

Please call me if you have any questions.

Sincerely,

Cyndie Eby

Attachments

No. of Copies rec'd 0+1
List ABCDE

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Executive Director-
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EX PARTE

April 1, 1996

Mr. James R. Coltharp
Chief Economist
Wireless Telecommunications Bureau
Federal Communications Commission
2025 M Street, NW, Room 5002
Washington, D.C. 20554

RE: CC Docket No. 95-185

Dear Mr. Coltharp:

On Friday, March 29, 1996, Professor Robert G. Harris, Law & Economics Consulting Group, Inc., in his discussion with you, mentioned a document by EDS Management Consulting Services. U S WEST Communications, Inc. is providing *An Ice Age is Coming to the Wireless World* at this time.

In accordance with Section 1.1206 (a)(1) of the Commission's rules, the original and one copy of this letter are being filed with your office.

Acknowledgment and date of receipt are requested. A duplicate of this letter is included for this purpose.

Sincerely,

Cyndie Eby

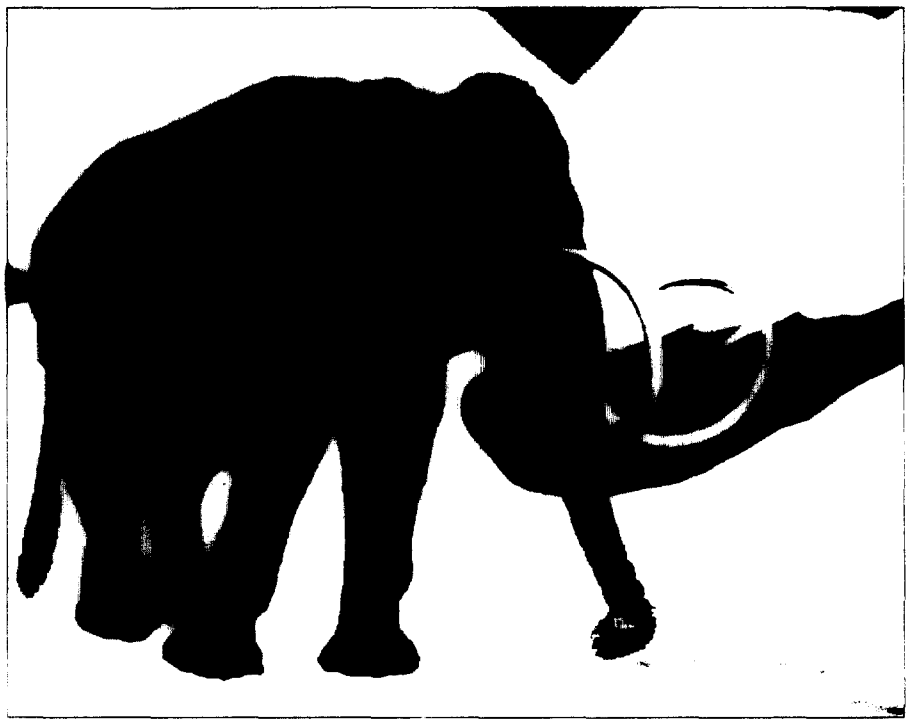
Attachment

cc: Mr. Joseph Farrell

An Ice Age is Coming to the Wireless World

A Perspective on the Future of Mobile Telephony in the United States

Carl Robert Aron, National Director
Wireless Consulting Practice



Communications & Electronics Industries Consulting
1995 Thought Leadership Series

Management Consulting Services

Carl Robert Aron

Carl Robert Aron is the National Director of Wireless Industry Consulting for EDS Management Consulting Services. Mr. Aron is also national director of the UtiliCom℠ (Utilities Telecommunications) Consulting for EDS. He brings more than 25 years of executive, legal, and regulatory experience in the telecommunications industry to the Communications & Electronics practice of EDS.

Formerly Chief Executive Officer of RAM Broadcasting Corporation, Mr. Aron guided the growth and development of the company from its origins as a small radio paging company to the status of a leader in wireless technology, particularly mobile data network operations (RAM Mobile Data) and telecommunications engineering consulting (RAM Communications Consultants).

Mr. Aron's extensive legal experience augments his expertise in communications, and he is well versed in regulatory and international communications issues.

Mr. Aron is based in the New York office of EDS Management Consulting. If you have any questions or wish to discuss issues raised in this monograph, please contact him at (212) 382-4507.

An Ice Age Is Coming to the Wireless World

Carl Robert Aron, National Director
Wireless Consulting Practice

Communications & Electronics Industries Consulting

1995 Thought Leadership Series

This Thought Leadership Series has been initiated to discuss key issues facing the Communications and Electronics Industries, including the Wireless, Telecommunications, Information, Entertainment and Broadcasting, and Electronics Industries. If you would like to be placed on the mailing list, or if you have any questions about the Series or our management consulting capabilities in the Communications and Electronics Industries, please call Ms. Amy L. Kozlowski at (703) 908-3149.

Summary Table of Contents

Table of Contents

Executive Summary

A minister whose Sunday service was to be attended by the Duke of Wellington asked the Duke what his sermon should be about. The Iron Duke replied, "About ten minutes."

Arthur Wellesley
Duke of Wellington (1769-1852)

The wireless world is about to undergo a very substantial change. That change will undermine common beliefs, upset widely held expectations, and cause substantial disappointment. The nature of that change is, perhaps, best communicated through the use of metaphor, and, thus the notion of a coming Ice Age with all of its implications in terms of climatic hostility and decreased food supply seems an appropriate device to assist in explaining the new conditions coming to the Wireless World.

At any time, four fundamental forces determine whether inhabitants of the world of mobile telephony enjoy prosperity or starve into extinction: the nature and number of the inhabitants (competitors); the adequacy of the food supply (revenue); the skill level (operational effectiveness) of the population; and the availability of stores of food (the supply of capital).

The period from 1983 to 1995 was a period of plenty for the inhabitants of the wireless world because the population (of competitors) was small, the food supply (revenue) was more than adequate for the population, the skill level of the population (their operational effectiveness) was not critical to their survival, and the stores of food (supply of capital) were more than adequate to cover the consumption habits of the population. That period was the Golden Age of Wireless.

The conditions for prosperity in the Golden Age were not created by the inhabitants of the wireless world because the smallness of the population (the cellular telephone duopoly) was a gift from the FCC, and the growth of food developed without an intense level of competition between the inhabitants in any locale.

The inhabitants of the Golden Age became successful and often wealthy because they were carried by market forces, not because of their skills (and, sometimes, despite the lack thereof). Lack of skill was not severely punished in the Golden Age, because capital was available to the skilled and the unskilled alike.

The adequacy of food and the few inhabitants of the Golden Age together assured a low level of competitive intensity because duopolists have a significant disincentive to compete on price, and valuation methodologies minimized the importance of market share.

Based upon their experience, the inhabitants of the Golden Age established a set of lessons which will be dangerous to follow or rely upon in the Ice Age to come. Those lessons were the following:

- **"We know how to compete because we've been doing it for years."**
- **"If you build it, they will come (always in adequate numbers)."**
- **"Operational effectiveness affects profitability, not survival."**
- **"Ownership of radio spectrum is an assurance of wealth."**

Following those lessons in the Ice Age will be a formula for extinction.

The coming Wireless Ice Age will be the product of radical changes in the fundamental forces which shape the wireless world. The population (number of competitors) will increase significantly, and crop yields (revenue) will, in time, stop growing. The importance of skills (operational effectiveness) will increase a hundredfold, and the availability of stores of food (capital) will decrease.

In the Wireless Ice Age, growth in the population will lead to a very significant increase in the intensity of competition. That competitive intensity will assure significant decreases in service pricing. The following factors will assure an extraordinary increase in the intensity of competition:

- The many new players entering the market;
- The absence of a competitor with dominant market share;
- The eventual slowing of market growth;
- High churn rates;
- The diversity of strategic interests and agendas; and
- Competitors' targeting the same market segments.

In the Wireless Ice Age, crop yield (revenue) growth will slow and will become inadequate to feed the whole population (all the competitors). Decreasing prices will contribute to revenue inadequacy, and this revenue inadequacy will contribute to the increase of competitive intensity. A downward price spiral may well develop.

Scarcity of food (revenue) will cause the starvation of some, perhaps many, of the inhabitants of the Wireless Ice Age. In many wireless markets, the survival of a competitor will depend upon its ability to secure a disproportionate market-share. Under conditions of revenue inadequacy, the survival of one competitor requires the extinction of another.

In the face of revenue inadequacy and intense competition, operational effectiveness in the Ice Age will be a critical success factor to a degree unprecedented in the Golden Age. **Competitive skills will not only increase the likelihood of survival on the part of one competitor, but they also increase likelihood of extinction on the part of another.**

In the Wireless Ice Age, those who have provided capital to network operators will demonstrate much greater sensitivity than they did in the Golden Age to the results of the operations of the providers of mobile telephone service in which they invest. As capital providers become weary of prolonged price wars and the consequent negative cash flows, operators will find that capital will rapidly become much less available.

The following are Laws of Survival applicable to the Ice Age.

I. The food supply is not large enough to support all inhabitants, and the survivors will be those who act upon that dismal conclusion.
II. To survive, inhabitants must fight successfully for more than their share of the food supply and, by so doing, assure the starvation of those who fight less successfully.

III. No two inhabitants can both survive if they fight for their share of the food supply in the same way because one of them will have some advantage in that form of fighting and assure the extinction of the other inhabitant by depriving it of food.

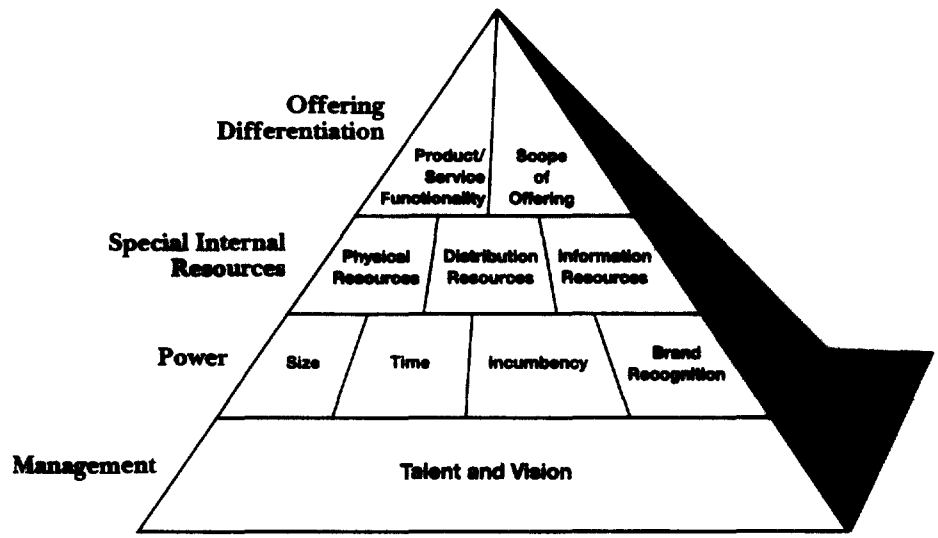
IV. An inhabitant will survive only if it is able to fight for its share of the food supply using a strategy others cannot use or cannot use as well.

V. A strategy to fight for food must not only be better *executable* by an inhabitant in principle, but also better *executed* by that inhabitant in fact in order to offer the prospect of survival.

VI. A strategy to fight for food must be aimed to capture enough food to assure survival or the most effective execution of that strategy would be pointless.

VII. Never lose access to stores of food (capital) in times of inadequate crop yields (annual revenue).

To survive the Ice Age, a competitor will need to create a strategy by integrating the sources of competitive advantage to which it has superior access. **The sources of competitive advantage in wireless telephony include management talent and vision, size, functionality, time, physical resources, information resources, distribution resources, brand recognition, incumbency, and scope of offering.** Those sources of competitive advantage can be classified as follows.



The process of integrating sources of competitive advantage to create a strategy appears to indicate four centers of gravity around which those sources can be focused:

- **Lowest Cost Service** - The provider engineers its enterprise to offer a wireless telephony service of an acceptable quality at a cost lower than any of its competitors.
- **Focused Service Superiority** - The provider concentrates on continuing

development of its wireless service offerings, which offer noticeably superior value by reason of leadership in wireless service and wireless product innovation.

- **Horizontal Service Integration** - The provider focuses on its ability to bundle other services with the wireless products thereby offering a broad range of communications services.
- **Superior Customer Relationship** - The provider focuses on managing every aspect of the customer interface, thereby reducing churn and attracting customers who value such a relationship.

While the selection of an effective competitive strategy will help to prepare a competitor to meet the challenges of the Ice Age, that selection will not alone assure success. Ice Age inhabitants, like their distant ancestors, will have to develop and use tools to eke out adequate sustenance under those hostile conditions. Tools exist to maximize fitness (operational effectiveness) and to provide advantage in the competition for sustenance (revenue). The following table lists tools useful in effective strategy execution and the relative importance of those tools to the four indicated strategies.

	Lowest Cost Service	Focused Service Superiority	Horizontal Service Integration	Superior Customer Relationship
Customer Understanding				
Market Decision Support Systems	Low	High	Medium	Medium
Market Analysis Modeling	Medium	High	High	High
Customer Attraction				
Distribution Management	High	High	High	High
Brand Enhancement	Medium	Medium	Medium	High
Database Marketing	High	High	High	High
Customer Loyalty				
Customer Loyalty Programs	Low	Medium	Medium	High
Customer Management Systems	Low	Medium	Medium	High
Firm Operations				
Product Development Stream				
Integrated Product Development	Low	High	Medium	Medium
Revenue Stream				
Revenue Assurance	High	Low	Medium	Low
Operations Resources				
Information Technology Resources				
Information Systems Planning	High	High	High	High
Automation Evaluation	High	Medium	Low	Medium
Enterprise Data Sharing	Low	Medium	High	High
Organizational Resources				
Organizational Alignment	High	High	High	High
Vendor/Partner Integration	Low	High	High	High

Note that those techniques of "high" importance to all the strategies are designated in blue. The more effective utilization of such tools will provide the distinction between the survivors of the Wireless Ice Age and those who become extinct.

Prepare thyself – the Ice Age cometh.

Introduction

"Ever since the acceptance of former widespread glaciations, the ice ages have been both a means to measure time and a potent external force for change."

Clive Gamble
Timewalkers,
The Prehistory of Global Colonization, 1994

"Climate plays an important role in determining the average numbers of a species, and periodical seasons of extreme cold, or drought, I believe to be the most effective of all checks... The action of climate seems at first to be quite independent of the struggle for existence; but in so far as climate chiefly acts in reducing food, it brings on the most severe struggle between the individuals, whether of the same or of distinct species, which subsist on the same blend of food. Even when the climate, for instance extreme cold, acts directly, it will be the least vigorous, or those which have got the least food throughout the advancing winter, which will suffer the most."

Charles Darwin
***On the Origin of Species* (1859)**

Sometime in the first decade of the next century, an historian of business or technology will look back upon the development of the wireless telephony industry since, say, 1983 and write as follows:

"The years 1983 to 1996 were clearly the Golden Age of Wireless. They were years of great good fortune. Certain of those who shared in the bounty of that period attributed their success entirely or substantially to their own skill and foresight. In retrospect, that attribution was not entirely proper.

"The pace of subscriber and revenue growth seemed extraordinary and appeared destined to continue. Certain contemporary observers of the Golden Age of Wireless predicted its continuation into this century. That prediction did not prove to be correct.

"In the period 1996 to 1997, change came to the world of wireless communications – change so radical and so adverse that industry participants began to look longingly back at the past and with fear and trembling toward the future. Those who did not live in those times will have difficulty understanding the magnitude and significance of that change. It appeared that a major alteration in climatic conditions had come to the wireless world. The Golden Age had given way to something very different.

"Research into the business literature of the period 1996-1998 concerning the wireless industry reflects increasing confusion, deepening distress, and a general disappointment in expectations, all related to a change in the competitive climate, the implications of which had not been fully anticipated. It is difficult today to picture that period solely in terms of statistics and financial results. Only by resort to metaphor can a sense of that period be communicated. It was as if the Golden Age had ended, and an Ice Age had descended upon the wireless world.

"The fertile fields and friendly climate of the Golden Age of Wireless had produced a bountiful crop of revenue, generally more than what was needed to feed the appetites of the inhabitants of that world. Then, that climate and those fields were fundamentally altered. In the Ice Age that followed, the revenue crop soon became inadequate to support all of those living in the wireless world.

"The imbalance of sustenance and population was so severe that the less well fit inhabitants of the wireless world became extinct. The fittest did, however, survive, although not without severe difficulty, and emerged from the Wireless Ice Age to prosper."

From today's vantage point, this imaginary retrospective is, of course, no more than a veiled prediction of the future of the wireless industry. This monograph will continue the Ice Age metaphor and set forth, in greater detail, a new perspective on the past and a rather chilling vision of the future. **At the core of this monograph is the belief that four fundamental forces shaped the environment of the Golden Age of Wireless:**

- **Population (Competitors);**
- **Food Supply (Revenue);**
- **Skills (Operational Effectiveness); and**
- **Stores of Food (Capital Availability).**

During the Golden Age, those forces inevitably led to prosperity for almost all inhabitants. A Wireless Ice Age is about to occur because of powerful changes in those forces. In terms of population growth, the number of competitors and networks will increase significantly. In terms of decreased food supply or lower crop yields, the soil will become relatively less fertile as a result of decreasing service prices and the diminished number of untapped subscribers. In terms of stores of food, capital availability will become, at the very least, uncertain as the financial markets change their methods of valuing the inhabitants of the wireless world. In terms of skills, their importance will be magnified more than a hundredfold.

Skills are the only fundamental force over which the inhabitants of the wireless world have substantial control and will thus become critically important in the Ice Age. The number and type of competitors will increase regardless of the actions of any industry participant. Although market shares, and hence revenues, are

partially controllable, the inadequacy of overall industry revenues will not be alterable by the actions of any one market participant.

It will be essential for the inhabitants of the Wireless Ice Age to develop strategies suitably hardened for the hostile environmental conditions, but even strategies hardened for Ice Age survival will not alone assure success. Ice Age inhabitants, like their distant ancestors, will have to develop and use tools to eke out adequate sustenance under those hostile conditions. Tools exist to maximize fitness (operational effectiveness) and to provide advantage in the competition for sustenance (revenue). The more effective utilization of such tools will provide the distinction between the survivors of the Wireless Ice Age and those who become extinct.

* * * * * * *

This monograph focuses upon one industry segment – mobile telephony, including cellular telephony, personal communications services (PCS), and enhanced specialized mobile radio services (ESMRS). Paging networks, mobile data networks, and mobile satellite systems are not the direct focus of this monograph, although the principles developed in this monograph apply, in substantial measure, to those segments as well.

The structure of this monograph is built around an examination of how the four fundamental forces operated to shape the past (Chapter 2) and how they will operate to shape the future (Chapter 4). In the transition from the past to the future, myths or misunderstandings concerning those forces are identified and considered (Chapter 3). The focus upon the future includes a review of the strategies and tools useful in the quest for Ice Age survival (Chapter 5) and a final section setting forth certain conclusions concerning market development (Chapter 6).

The Fundamental Forces in the Golden Age

> *"Some make the deep-seated error of considering of the physical conditions of a country as the most important for its inhabitants; whereas it cannot, I think, be disputed that the nature of the other inhabitants with which each has to compete is generally a far more important element of success."*
>
> **Charles Darwin,**
> ***On the Origin of Species* (1859)**

The Golden Age of Wireless (1983-1996) was made possible by the fundamental forces then in effect. Those forces generally supported prosperity throughout the period. Why did they assure prosperity? Were there any defining events in the Golden Age, events so significant that they framed the balance of the fundamental forces in that period? Were there events in the Golden Age so important that their impact will continue to be felt in the coming Wireless Ice Age? These inquiries will be pursued in this chapter.

2.0 The Cellular Telephone Industry in the Golden Age

The period 1983-1996 in the cellular telephone industry is properly referred to as the Golden Age because:

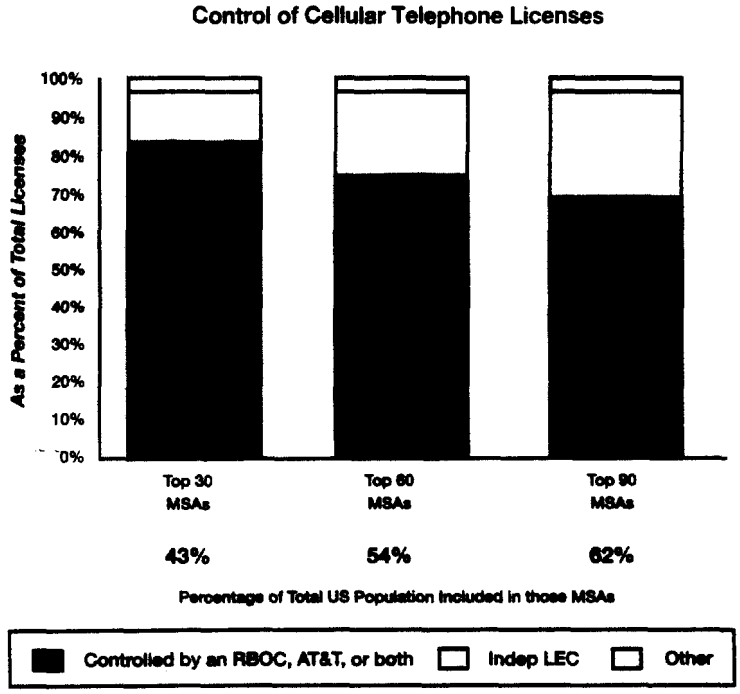
- The population (of competitors) was small;
- The food supply (revenue) was more than adequate for the population;
- The skill level of the population (their operational effectiveness) was not critical to its survival; and
- The stores of food (capital) were more than adequate to cover the consumption habits of the population.

2.1 Population

Consideration must first be given to the structure of the population and the nature of competition between and among its members.

2.1.1 Population - Industry Structure

The fundamental facts of industry structure in cellular telephony today are that the RBOCs and AT&T control the overwhelming majority of licenses in the top 30, 60, and 90 markets, as shown in the figure on the next page:



The present degree of concentration of ownership reflected in the figure is in stark contrast to the pattern of ownership before the first acquisition by a wireline cellular carrier of a non-wireline cellular carrier – the acquisition of Communications Industries, Inc., by Pacific Telesis in 1985.
Prior to the Communications Industries/PacTel transaction,

- AT&T owned no cellular telephone licenses;
- The RBOCs and major independent telephone companies owned fewer than half of the 180 licenses for the 90 largest MSAs; and
- Entrepreneurs and smaller independent companies owned fully half of all cellular telephone licenses.

Industry consolidation, at least as it developed, was hardly inevitable. It did not follow simply or linearly from a systematic pattern of acquisitions over time. **Rather, the degree of industry consolidation resulted from withdrawal of certain powerful, or potentially powerful, players from the marketplace; a lack of commitment to the cellular telephone industry on the part of most, if not all, of the original non-wireline operators; and the failure of one or more of the RBOCs to acquire certain critical non-wireline licenses when they became available, thus making more likely the emergence of AT&T as a major provider in the cellular telephone industry.**

The effects of cellular telephone industry consolidation upon the nature of competition in the Golden Age were profound, and the impact of that consolidation will not have been dissipated before the arrival of the Wireless Ice Age or for long thereafter.

Attention to the consequences of industry concentration will be left to later sections, and attention here will be focused upon the causes of the present state of industry consolidation and the process by which it has been reached.

The following events have defined the current industry structure.

- **The Federal Communications Commission's establishment of a duopoly market structure (Section 2.1.1.1);**
- **The withdrawal by AT&T from cellular telephone operations before the industry began (Section 2.1.1.2);**
- **The settlement and rationalization of ownership among the non-wireline carriers in the 31st through 90th largest markets and the opportunity that rationalization created (Section 2.1.1.3);**
- **The failure of MCI to seize the opportunity and the very effective opportunism of McCaw Cellular Communications (McCaw) in stepping into the void left by the inaction of MCI (Section 2.1.1.4);**
- **The acquisition of LIN Broadcasting Corporation by McCaw and the RBOCs' decision not to prevent LIN's cellular properties from becoming available for a second time when McCaw itself was put into play (Section 2.1.1.5);**
- **The acquisition of McCaw by AT&T and the related realization that wireless telephony was not only a source of revenue, but also a method for avoiding access charges imposed by the local exchange carriers (Section 2.1.1.6); and**
- **The completion of the A Block and B Block Broadband PCS auctions (Section 2.1.1.7).**

Each of these matters is discussed below.

2.1.1.1 The Establishment of the Duopoly

In significant measure, the present structure of the cellular industry is still attributable to the decision of the FCC to license only two competitors in each market (MSA or RSA), one of which would be the telephone company providing wireline telephone service in the market, and the other would be anyone else.

This scheme meant, in practice, that all of the wireline licenses for the larger markets were awarded to RBOCs or larger independent telephone companies (e.g., GTE, Sprint, Contel Cellular) and that the non-wireline licenses went to a far more diverse group, including companies that had their origins in the paging business (e.g., Radiofone, MCCA, RAM Communications), the broadcast business (e.g., Metromedia, LIN Broadcasting Corporation), companies formed by entrepreneurs with cable experience (e.g., Metro Mobile, McCaw), companies formed by entrepreneurs with diverse experience (e.g., Charisma Communications, Cellular Communications Inc.), established telecommunications operators which did not provide local exchange telephone service (e.g., MCI, Western Union), and many other companies (e.g., *The Washington Post*).

The establishment of this wireline/non-wireline duopoly provided the basis for later industry consolidation because it gave half the licenses to generally well-funded companies committed to the communications business and half the licenses to companies whose owners were quite willing to exit the business for cash.

As the value of cellular properties rose, substantially all of the non-wireline licensees exchanged their positions for cash. Much, but not all, of this exchange occurred with the RBOCs – the licensees on the wireline side.

What if AT&T had chosen to enter the cellular telephone business at its inception? Wireless telephony might actually have grown more quickly. AT&T would probably have recognized earlier than it did the value of cellular telephony as a means of avoiding access charges imposed by the local exchange carriers (LECs). The RBOCs would likely have acquired the non-wireline carriers, particularly, where possible, in the RBOCs' respective territories. Cellular telephony would have become a wireline substitution technology in the hands of AT&T earlier than will now be the case. The RBOCs would likely have supported earlier FCC licensing of Personal Communications Services to obtain in-territory spectrum to contend with AT&T.

2.1.1.2 The Withdrawal of AT&T from Cellular Telephony

It appears to be the case that AT&T could have retained the cellular licenses which were awarded to the RBOCs and that AT&T permitted those licenses to become a part of the assets divested by AT&T. Documentary evidence is not publicly available, but interviews with individuals involved in the decision indicate that AT&T made the judgment (or received advice) that there would be only 900,000 cellular telephone subscribers nationwide by 1995 and that, in consequence, the cellular telephone industry would not be of sufficient size to warrant the interest of AT&T.

AT&T, of course, reversed its judgment on the cellular telephone business in 1994 when it acquired McCaw for $12.6 billion.

2.1.1.3 Rationalization of Non-Wireline Ownership

For the 30 largest MSAs, there were 142 applicants, and the FCC determined the successful applicant for a cellular telephone license by comparative hearings, unless all the contending applicants could form settlement partnerships and avoid comparative consideration. All or substantially all wireline licensees in the 30 largest MSAs were determined by agreement among eligible applicants which formed settlement partnerships, as were a significant number of non-wireline licenses. For the 31st through 90th largest markets, the number of applications on the non-wireline side soared to 814. Comparative hearings became an impractical method of determining the successful licensee promptly.

The trading which took place as a part of the settlement among non-wireline applicants proceeded first on the basis of population, but minority positions in different markets did not always represent equal interests in population. One trader insisted upon being compensated for the difference between the population he was offering and the lesser population he was offered. After extensive haggling, his trading partner finally said, "All right already, how much do you want per POP?" Thus, the now well-established "dollars per POP" formula was born. Subsequent efforts to give "POP" formal acronym status have been unavailing and do not reflect the essential flippancy of the term's etymology.

The non-wireline applicants feared that regulatory delay would give the wireline licenses a significant headstart in operations. Accordingly, in 1985, the non-wireline applicants settled the matter of license ownership in those 60 markets by agreeing that each applicant in a market would receive an equal share in a licensee partnership and by trading minority partnership interests to aggregate larger or controlling positions in fewer markets.

The non-wireline settlement of the 31st through 90th markets had a number of important effects. First, the settlement process conditioned players on the non-wireline side to see their cellular telephone partnership holdings as trading chips. Second, the settlement established a convenient way of talking about the cash equivalence of cellular telephone interests – dollars per POP. Third, the settlement rationalized holdings and created controlling interests and, thereby, made those interests easier to sell and more valuable to the buyers. Fourth, and most important at the time, the settlement allowed the non-wireline operators to get into business more quickly and establish that the non-wireline operations were viable.

In summary, the settlement made subsequent consolidation easier.

2.1.1.4 The Withdrawal of MCI and the Emergence of McCaw

What if MCI had not withdrawn from the cellular telephone industry? MCI might have been able to obtain a jump upon AT&T in the use of wireless telephony for local access. MCI might have given the non-wireline licensees a competitive advantage over the wirelines by bundling cellular and interexchange services or by offering very wide calling areas which could not be matched by the RBOCs with their MFJ restrictions. Roaming might have been available earlier, more widespread, and more effective if MCI had applied itself to using its network capabilities to that end.

Most of the non-wireline carriers were ultimately purchased by the RBOCs or McCaw. Matters might have developed differently, because MCI was an early player in cellular telephony and had great ambitions to be the organizer of the non-wireline operators. However, MCI's plans in this respect were not effectively executed because it grossly overestimated the importance those entrepreneurs would attach to assistance from MCI and chose not to back its ambitions with funding for acquisitions. In 1985, MCI sold its cellular telephone interests to McCaw.

The non-wireline operations were left to be acquired by the RBOCs, whose disabilities under the Modification of Final Judgment entered in the antitrust case leading to the AT&T divestiture (MFJ) left them unable to organize efficient regional networks, or by McCaw Cellular Communications which had great ambitions in relation to the creation of a national cellular telephone network, but lacked the infrastructure of the interexchange carriers such as AT&T or MCI. The withdrawal of MCI following the earlier withdrawal of AT&T left the non-wireline cellular carriers without a national organizer or regional organizers which were free of legal restraints and able to provide infrastructure useful in large-scale integration of cellular networks. The stage was being set for the later return of AT&T.

2.1.1.5 The Battle for LIN Broadcasting

What if an RBOC had acquired LIN? AT&T might well not have purchased McCaw, for how attractive would McCaw have been without New York and Los Angeles? AT&T would have been remitted to a PCS strategy, which would delay its obtaining local access by wireless means.

In 1990, McCaw acquired a controlling interest in LIN Broadcasting Corporation after a bidding war with at least one RBOC. Prior to the acquisition of LIN Broadcasting Corporation, McCaw had no material license interests in the five largest markets and only one material interest in the top 10 largest markets. The interests of McCaw covered a very substantial population, but relatively little population in the largest of markets. With LIN Broadcasting Corporation, McCaw acquired the interests indicated in the figure below.

LIN's Cellular Interests at the Time of the McCaw Acquisition

MSA	MSA Number	Equity Interest	Voting Interest
New York	1	45%	50%
Los Angeles	2	40%	50%
Philadelphia	4	51%	51%
Dallas	9	60%	60%
Houston	10	56%	50%

Source: LIN Broadcasting Corporation 1990 Annual Report

Note: Shortly thereafter, LIN acquired an additional interest in the New York MSA from Metromedia, which raised its aggregate equity interest to 93% and its voting interest to 100%. As part of that transaction, LIN's equity and voting interests in the Philadelphia MSA were reduced to 49.99%.

The LIN acquisition not only changed the importance of McCaw in the cellular industry by orders of magnitude, but also kept the LIN properties out of RBOC control. It is probably the case that the LIN acquisition by McCaw made the subsequent acquisition of McCaw by AT&T, if not inevitable, then, at least, much more likely. AT&T had to see in McCaw an aggregation of wireless properties which were large enough and distributed in such a manner as to offer in one transaction a major re-entry into the wireless business and the possibility of realizing the related benefit of wireless local access.

2.1.1.6 AT&T's Acquisition of McCaw

The acquisition of McCaw by AT&T, first announced in November 1992, brought an indisputably major new player into the cellular telephony industry and caused attention to be focused on issues such as the economies of scope and scale and the importance of a national wireless offering.

The RBOCs and large independent telephone companies reacted in different ways – some by joining in alliances among cellular carriers to provide an alternate path to a national wireless telephony offering (PCS PRIMECO, formed by AirTouch, US WEST, Bell Atlantic, and NYNEX), some by joining with industry outsiders to leverage other infrastructures (e.g., cable facilities) to offer PCS (Wireless Co., formed by Sprint, TCI, Cox, and Comcast), and others by scaling back their PCS ambitions and getting ready to defend their own territories (e.g., BellSouth, Ameritech, SBC Corporation).

2.1.1.7 The Broadband PCS License Auction

In March 1995, the FCC completed its first auction of broadband PCS licenses. (See Section 4.1.1 for a more detailed discussion of those auctions.) That first auction of licenses to provide broadband Personal Communication Services is the most recent critical development in the structure of the wireless telephony industry. That auction and other broadband PCS auctions which follow will precipitate the changes which will lead to the Wireless Ice Age.

The major winners of broadband PCS licenses which purchased with a view of creating a national or near-national wireless presence were WirelessCo., PCS PRIMECO, and AT&T. Other winners supplemented their cellular telephone interests on a regional basis, established regional concentrations of PCS licenses, or focused upon diverse markets.

2.1.2 Population - Nature of Competition

The nature of competition between and among cellular telephone system operators in the Golden Age was the result of the following factors:

- **The duopoly nature of the intra-market competition for subscribers;**
- **The increasing concentration of ownership in the hands of the RBOCs;**
- **The increasing value of cellular telephone interests (measured in $/POP) over time; and**

- **The growing sense that cellular industry participants had less to worry about from their present competition than their future competition.**

The factors which determined the nature of competition and the degree of competition were played out in multiple forums.

- First, there was competition in the marketplace for subscribers.
- Second, there was competition in the market for the purchase and sale of cellular interests.
- Third, there was competition at the FCC in the proceedings leading to the creation of Personal Communication Services both to protect the interests of the cellular industry and to secure a place for cellular telephone system operators in the new world of PCS.

The degree of competitive intensity varied greatly with the forum and the time.

2.1.2.1 Competition for Subscribers

The degree of the intensity of competition for subscribers was, in large measure, a product of the FCC-established duopoly in each MSA and RSA. Oligopoly behavior (of which duopoly behavior is a special case) has been much studied by economists, and, while different theories may have been offered to explain competitive behavior, it appears that economists generally agree that competitive intensity in terms of price is not to be expected in a duopoly market.

The theory of duopoly behavior finds no repudiation in the cellular telephone industry. Indeed, the GAO's recent studies of the cellular industry found that "rates are in excess of competitive levels and that they are consistent with non-competitive duopoly behavior."[1] The GAO recognized that "a market in which only two firms provide a product or service – like the cellular market – is unlikely to have competitive prices because the firms may have incentive to recognize their interdependence and maintain prices above the competitive level."[2] Airtime pricing has, until recently, generally remained stable at a high, but not exorbitant level.

In California, the real price per minute of use in the top four markets (Los Angeles, San Francisco-Oakland-San Jose, San Diego and Sacramento) show little or no price declines since 1989:

Average Price Per Minute	
1989	*$0.516*
1990	*$0.520*
1991	*$0.536*
1992	*$0.517*
1993	*$0.517*

Source: CA PUC PR Docket No. 94-105, October 18, 1994

Although competitive intensity for subscribers was low in relation to airtime pricing, competitive intensity was much greater in relation to handset subsidies (clearly, a form of price competition, but not one affecting continuing revenues, only one-time costs) and in relation to the securing of distribution channels (another form of price competition, but one the effects of which did not lower airtime costs for subscribers).

Subject to certain exceptions, price competition has centered upon handset pricing subsidies rather than airtime pricing. That observation does not, however, compel the conclusion that competition was in no way intense. In fact, handset subsidies have been high and very competitive and have contributed to a growing problem in the industry – the high cost of sale (averaging about $540, inclusive of the handset subsidy). That problem is, of course, exacerbated

[1] *GN Docket No. 93-252, summarizing the Congressional Budget Office, Auction Radio Spectrum Licenses, March 1992*
[2] Telecommunications: *Cellular Service Competition, GAO/T-RCED-9393, January 12, 1993*

Cellular telephone network operators believe that their industry was intensely competitive, but the evidence of price competition offered was most often in relation to handset subsidies, not airtime pricing.

"What is driving [the] extraordinary growth [of cellular telephone subscribers]?... Cost is one key. In some of our markets, phones sell for as little as $1, compared to $3,000 a decade ago, the result of a highly competitive industry."

Southwestern Bell Corp.
1993 Annual Report

by declining average revenues per subscriber per month, which have gone from $89.30 in 1989 to $56.21 in 1994.[3] Thus, the competition in handset subsidies cannot be minimized, and, indeed, the financial burden or network operators of that competition becomes greater as average revenues decline.

Competition for customers also took an indirect form in the competition for distribution channels. The nature of the competition for distribution channels was in terms of the price payable to agents for activations or the discounts available to resellers. This competition has been intense from time to time, and its focus has shifted, in some degree, from smaller outlets (e.g., car stereo shops, two-way radio dealers) to major retail chains in order to reach the broader consumer market.

Competition for customers has also taken the form of efforts to differentiate service offerings. Although industry participants have had much to say on this subject, in fact, the essential form of differentiation has been in terms of the geographic scope of coverage and the related issues of roaming. The cellular telephone industry has not offered many successful examples of the use of service quality as a differentiation factor, and there is a widely-held perception that cellular telephony service quality is often poor, a reflection of the dropped calls, holes in coverage, and cross-talk experienced by subscribers.

In summary, competition for subscribers took forms consistent with what would be expected in a duopoly marketplace. No duopolist appeared to see advantage in intense competition over airtime pricing (at least not for long). Perhaps, more fundamentally, no duopolist sought to compete with an intensity designed to drive its competition to the wall.

2.1.2.2 Competition for Properties

"BellSouth saw the potential in international telecommunications markets early, and is seizing the initiative in countries that offer the greatest potential of sustainable growth. The strategy is making BellSouth a leader in wireless worldwide. We now have considerably more cellular "pops," or potential customers, outside the U.S. than we do in this country..."

BellSouth
1992 Annual Report

Cellular telephony industry participants, particularly, the RBOCs and McCaw Cellular Communications, competed with one another for the purchase of non-wireline cellular properties. At times, as in the case of the acquisition of LIN Broadcasting, the competition became intense.

The competition for properties was fueled by the increasing value of cellular telephone interests measured in $/POP over time. All industry participants benefited from these increasing values. Sellers benefited in terms of the higher prices received, and buyers (and even industry nonparticipants in the transaction) benefited from the implicit upward revelation of their cellular telephone holdings as $/POP rose.

Hoping that the market value for their equity securities would rise with increasing $/POP, the RBOCs and McCaw sought to increase their domestic POPs. The RBOCs, in partucular, sought to increase their overall POPs by joining in consortia to secure foreign mobile telephony licenses. The results of those efforts are reflected in the figure on the following page.

[3] *Cellular Telephone Industry Association*

International POPs

Regional Bell Operating Company	1994 Number of Countries	Adjusted International POPs	Percentage of Total Company POPs
AirTouch	8	64,101,200	64.4%
Ameritech	2	10,050,450	31.2%
Bell Atlantic	5	36,886,200	52.3%
BellSouth	10	52,633,550	56.9%
NYNEX	2	3,130,000	13.8%
Southwestern Bell	3	18,077,100	31.9%
US WEST	7	47,515,500	70.5%

Source: Donaldson, Lufkin & Jenrette

Competition for the acquisition of cellular interests could at times become intense on both the domestic and international fronts. On the domestic front, it appears that the RBOCs did not believe as fervently in an ever increasing $/POP for cellular properties, whereas McCaw gave evidence of being a true believer.

The greater conservatism of the RBOCs was not entirely institutional. The RBOCs always purchased cellular properties to hold, not to sell. (The spin-off of AirTouch by Pacific Telesis is not evidence to the contrary and is explained on other grounds.) McCaw, on the other hand, at least in retrospect, purchased cellular properties with a view to resale and thus, in the end, adhered to the entrepreneurial non-wireline pattern of cashing in, albeit after a long ride. Competitive intensity in acquisitions was, therefore, moderated by what may have been fundamentally different investment philosophies. These differences allowed McCaw to win in the struggle to own LIN and led to re-entry of AT&T into the cellular telephone industry.

The Cellular Telephone Industry Association was quite effective in protecting the interests of its membership before the FCC. CTIA assured the cellular telephone industry a role in PCS, contributed to the length of the PCS administrative proceedings at the FCC, and, perhaps most importantly, opposed national licensing, which would have posed a serious competitive threat and was not authorized. However, the FCC did authorize PCS, and clearly intended to increase competition in the mobile tele-phony market. In a 1994 interview with America's Network, *Reed Hunt, Chairman of the FCC, stated, "In PCS, we have for the first time in the history of this country made a commitment to competition from day one."*

2.1.2.3 Competition and PCS

In the last few years, particularly since it has become clear that the FCC would authorize PCS, the cellular telephone industry has evidenced a growing sense that its participants had less to be concerned about from one another than from the prospect of new competitors using the PCS spectrum.

The industry proved itself to be a formidable competitor in the regulatory process. The question remains, however, whether the forms competition took in the Golden Age of Wireless (and the intensity thereof) prepared the players for the forms and intensity of competition in the coming Wireless Ice Age.

2.2 Food Supply

The most outstanding characteristic of the Golden Age of Cellular Telephony has been the growth in the food supply – both the sources of food (subscribers) and the amount of food available (revenue). This outstanding growth is portrayed in figure on the next page.